A web platform for storing, sharing and executing scientific workflows for Natural Risk Assessment: part 1 – data, approaches and case studies

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To meet new societal, professional and scientific needs from different disciplines related to natural hazards and climate change, BRGM is currently acquiring a web platform allowing the execution of a scientific workflow and the production of valued data sets very useful to the natural hazard communities.

This platform insure reproducibility, allowing transparency but also improving efficiency by easing collaborative work and sharing results and practices to different end user or to scientists working on related topics.

The scientific scope is risk assessment in the domain of natural hazard (e.g. seismic, landslide, submersion) from the phenomenon modelling to the impact evaluation on exposed elements such as buildings and networks. It is intended to have a wide range of methods for calculating hazard and susceptibility and relations between risk and vulnerability for calculating damage. Workflow for data analysis, preparation and transformation are also in the scope of this platform in order to facilitate the work of scientists in manipulating their datasets.

This platform will allow the use of scientifically validated methods but it will also serve as an innovation tool allowing scientists to propose new methods of risk assessment and to proceed their validation more easily on several datasets covering different study areas.

In its first version, this web platform is designed for the use of BRGM experts and should be in a long-term ambition an open repository of executable workflows for national and international experts in the domain of natural hazards.

Currently several workflows are implemented for damage and risk calculation for different combinations between several hazards and different levels of description of the exposed elements. Among these workflows, we can summarize some of them that are use currently the most often by the BRGM hazard experts:

- Landslide damage scenarios where the hazard is represented by the official risk prevention plans (PPR) and by superposing the hazard levels with the number of the exposed elements affected by this hazard; the case study is Salazie area, La Reunion.

- Landslide damage scenarios where the landslide hazard is represented by the settlements obtained using remote sensing technics and the vulnerability of the exposed elements is described by fragility curves; the case study is Salazie area, La Reunion.

- Deterministic seismic damage scenarios using real-time generated ShakeMap; the case study is France.

- Probabilistic seismic damage scenarios where the parameters used in the deterministic seismic damage scenarios a described by a distribution law, instead of a unique value.

- Tsunami damage scenarios where the water height and water velocity describe the tsunami hazard and, yielding acceleration and ultimate acceleration describe the vulnerability; the case study is West Indies, France

Finally, in the section ESSI2.7 we present a complementary abstract with the description of the IT aspects and the interoperable architecture based on open-source components of this web platform.